OCR
RECOGNISING ACHIEVEMENT

GCSE

Environmental and Land Based Science

General Certificate of Secondary Education

Unit **B682/02/04** Plant Cultivation and Small Animal Care (Higher Tier)

Mark Scheme for June 2013

Oxford Cambridge and RSA Examinations

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

For answers marked by levels of response:

a. **Read through the whole answer from start to finish**

b. **Decide the level** that **best fits** the answer – match the quality of the answer to the closest level descriptor

c. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

d. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
not/reject	answers which are not worthy of credit
ignore	statements which are irrelevant - applies to neutral answers
allow/accept	answers that can be accepted
(words)	words which are not essential to gain credit
words	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	alternative wording
ORA	or reverse argument

Available in Scoris to annotate scripts:

	indicate uncertainty or ambiguity
BOD	benefit of doubt
CON	contradiction
	incorrect response
ECF	error carried forward
	draw attention to particular part of candidate's response
NBOD	no benefit of doubt

Annotation	Meaning
	reject
	correct response
	draw attention to particular part of candidate's response
	information omitted

Subject-specific Marking Instructions

a. Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).

b. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

e.g. for a one-mark question where ticks in the third <u>and</u> fourth boxes are required for the mark:

This would be worth 1 mark.

This would be worth 0 marks.

This would be worth 1 mark.

c. The list principle:
If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, e.g. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

d. Marking method for tick-box questions:

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.
If there is at least one tick, ignore crosses and other markings. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses. Credit should be given according to the instructions given in the guidance column for the question. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

e.g. if a question requires candidates to identify cities in England:

Edinburgh	
Manchester	
Paris	
Southampton	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third <u>should be blank</u> (or have indication of choice crossed out).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	×	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	×		✓		✓	✓		✓	
Score:	**2**	**2**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**NR**

Question			CBT Question Numbers	Answer	Marks	Guidance
1			1	$6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$	2	2 marks for correct balanced equation 1 mark for correct unbalanced equation
2	(a)		2	**L** at 7 arbitrary units on 30°C	1	
	(b)		3	**any two from:** increasing light increases rate of photosynthesis (because light is a limiting factor); over 5 (arbitrary units) temperature becomes the limiting factor; over 7 (arbitrary units) something else/carbon dioxide becomes limiting	2	**accept** rate of photosynthesis is higher at higher temperatures due to increased enzyme activity.
	(c)		3	increase the temperature (by up to 10°C); reference to enzymes; increase the carbon dioxide; most likely to be a limiting factor; increase light intensity only if temperature is also increased	3	increases rate of enzyme activity/ enzymes are not denatured **accept** reference to water/humidity linked to rate of photosynthesis such as turgidity of leaves/opening of stomata
3	(a)		4	**B** TomGrow	1	
	(b)		5	unknown quantity of potassium/other nutrients; slow to release nutrients; spread of disease/attracts pests	2	**accept** not enough nutrients/specified nutrient **accept** takes longer to work **accept** animal disturbance as they dig up banana for food.

Question			CBT Question Numbers	Answer	Marks	Guidance

4			6	**Level 3 (5–6 marks)**
				A detailed description of the appropriate techniques used to improve her soil, including appropriate scientific explanations and analysis of information from the table.
				Quality of written communication does not impede communication of the science at this level.
				
				Level 2 (3–4 marks)
				A description of appropriate techniques used to improve her soil, including some scientific explanation and the use of information from the table.
				Quality of written communication partly impedes communication of the science at this level.
				
				Level 1 (1–2 marks)
				A description of some appropriate techniques used to improve her soil.
				Quality of written communication impedes communication of the science at this level.
				
				Level 0 – (0 marks)
				Insufficient or irrelevant science. Answer not worthy of credit.
					6	**This question is targeted at grades up to A***
						
						Indicative scientific points may include:
						• The table shows that:
						  • as the pH increases the availability of NPK also increases
						  • At pH5 NPK is 55:35:50
						  • At pH7 100% of NPK are available
						• Addition of lime will neutralise soil
						• In acid conditions some nutrients are insoluble and so cannot be absorbed by plants. Neutralising the soil will make these nutrients available
						• Some ions such as aluminium ions are soluble at low pH and these can be toxic to plants
						• Low pH prevents cation exchange thus reducing nutrient uptake
						• Addition of lime causes the clay particles to flocculate and so improve drainage
						• Addition of coarse sand increases the size of particles in the soil and speeds up drainage
						• Digging and maintaining ditches and drains will help to increase the flow of water off the land
						• Waterlogged soils prevent root respiration leading to stunted growth of plants
						• Waterlogged soils prevent the activity of micro-organisms such as nitrifying bacteria
						• Addition of organic matter helps to improve aeration and drainage in the soil by improving soil structure.
						
						• **Ignore** reference to inorganic fertilisers

Question			CBT Question Numbers	Answer	Marks	Guidance
5	**(a)**		**7**	the number of whitefly increase initially then decrease; it takes time for the number of *Encarsia formosa* to breed so whitefly increase; (after 5 weeks) the *Encarsia* start to kill/eat/remove the whitefly so numbers decrease.	3	
	(b)		**7**	(yes)there were fewer whitefly when marigolds were present; (no) the number of whitefly still increased even when marigolds were present; no test for a chemical has been made/maybe other factors are important/correlation not causation.	2	
6	**(a)**		**8**	10 weeks; maximum germination after this time/any longer would delay planting/profit	2	**accept** 9-10 weeks **accept** 70-80% germination
	(b)		**8**	so that they germinate when the growing conditions are correct/not all seeds germinate so provides a seed bank/germination is synchronised/germinate in spring	1	**accept** germinate in spring **reject** reference to genetics **reject** appropriate conditions
7			**9**	**C** pellets **R** hay **S** dandelion leaves	2	

Question			CBT Question Numbers	Answer	Marks	Guidance
8			10	**Level 3 (5–6 marks)** A comprehensive account of the care of the rabbit during pregnancy and the rabbit and its young after the birth. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** An account, with some technical detail, of the care of the rabbit during pregnancy and the rabbit and its young after the birth. Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks)** A limited account of the care of a rabbit. Quality of written communication impedes communication of the science at this level. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to C** **Indicative scientific points may include:** • The doe should be in a suitable enclosure. They will need a hutch and a run • The doe should be separated from all other rabbits during her pregnancy and whilst she is weaning her kits • The hutch should be draught free to prevent the kits losing too much heat. It should be dry to stop the kits getting cold and it should be clean to prevent the spread of disease • The run will enable to doe to spend time away from the kits • During pregnancy and whilst she is feeding the kits, the doe should be given access to lots of high quality food such as hay, pellets, grass and vegetables to keep her healthy and provide the extra energy she requires • Extra hay should be provided in case it is needed for a nesting material • After giving birth the doe and kits should be checked regularly but without disturbing them too much • If the doe is stressed then she might reject her kits.
9	(a)		11	**any one from:** lack of calcium in diet; shell gland not working properly/eggs do not spend enough time in the shell gland.	1	

Question			CBT Question Numbers	Answer	Marks	Guidance
	(b)		**12**	the egg without the shell loses mass more quickly; evaporation of water/liquid (through the membranes)	2	
	(c)		**13**	the vent is used for removal of waste as well	1	

Question			CBT Question Numbers	Answer	Marks	Guidance
10			14	**Level 3 (5–6 marks)** A detailed description of the advantages and disadvantages of line and cross breeding which shows a clear understanding of the underpinning science. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** A description of the advantages and disadvantages of line and cross breeding. Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks)** Displays an understanding of the differences between line and cross breeding with an advantage or disadvantage of either. Quality of written communication impedes communication of the science at this level. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to A** **Indicative scientific points may include:** <u>Cross Breeding</u> Advantages • Results in hybrid vigour • Offspring display increased fertility • Offspring are more resistant to disease • Greater variation (with context) • Mongrel dogs often live longer than pure bred ones of similar size. Disadvantages • Unsuitable for showing • Greater variation (with context). <u>Line Breeding</u> Advantages • Reduces variation in offspring so animals conform to breed standards. Disadvantages • Leads to inbreeding (depression) • Inbreeding (depression) leads to reduced fertility • Inbreeding (depression) leads to increased susceptibility to disease

Question			CBT Question Numbers	Answer	Marks	Guidance
						• This is due to the increased risk of harmful double recessive alleles being displayed in the phenotype • Specific examples such as Persian cats can have difficulty breathing, British shorthair cats are more susceptible to kidney disease, Dalmatian dogs have an increased likelihood of deafness.
11	**(a)**		**15**	1 mark for correct working of increase amount of money spent (£1 billion); 1 mark for correctly calculating a % using the wrong numbers; 2 marks for the correct answer 200%	2	**accept** 250% **accept** 300%
	(b)		**15**	(Yes) with reference to the graph; (No) people could be spending more money on the same pets; Due to an increase in vets bills/greater range of animal products	2	

Question			CBT Question Numbers	Answer	Marks	Guidance
12			**16**	**arguments for:** too many strays/unwanted pets; abandoned pets/overcrowding at animal shelters; lack of knowledge about how to care for pregnant/lactating animals; pets are more placid and other behaviour traits **arguments against:** cost/risk of operations; prevents breeding/loss of genes; pets unable to display natural behaviour/instincts; can cause weight problems; can affect coat quality; decision cannot be reversed	3	At least one advantage and one disadvantage is needed for 3 marks. **Ignore** cruel or any reference to animal rights
				Paper Total	**50**	

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